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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/627,336	07/24/2003	Michael X. Yang	007669/P3/CMP/ECP	2292
44257	7590	09/30/2005	EXAMINER	
PATTERSON & SHERIDAN, LLP 3040 POST OAK BOULEVARD, SUITE 1500 HOUSTON, TX 77056			ZHENG, LOIS L	
			ART UNIT	PAPER NUMBER
			1742	

DATE MAILED: 09/30/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/627,336

Applicant(s)

YANG ET AL.

Examiner

Lois Zheng

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 July 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>7 February 2005</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Status of Claims

1. Claims 1-23 are currently under examination.

Priority

2. The claimed features of "the ionic membrane comprises a poly tetrafluoroethylene based polymer" as recited in instant claim 1, "the cationic membrane includes a fluorized polymer matrix" as recited in instant claim 11, and "a poly tetrafluoroethylene based ionomer cationic membrane" as recited instant claim 18 are not supported by the parent application 10/268,284 with a non-provisional filing date of 24 July 2002. Therefore, instant claims 1-23 have an effective filing date of 24 July 2003.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1-9 are rejected under 35 U.S.C. 102(b) as being anticipated by Copping et al US 6,251,255 B1(Copping) as evidenced by applicant's admitted prior art.

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Copping teaches an electrochemical apparatus comprising a fluid basin with an anolyte and a catholyte solution compartments separated by an ionic membrane(Fig. 1 numerals 12, 30, 32 and 28 respectively). Copping further teaches that the ion exchange membrane is a perfluorinated ion exchange polymer reinforced with polytetrafluoroethylene, such as NAFION[®] from Dupont(col. 2 line 50-67).

Regarding instant claims 1-9, Copping teaches an electrochemical plating apparatus having the same structure as that of the instant invention. In addition, the ion exchange membrane made from NAFION[®] from Dupont as taught by Copping inherently meets the limitations of instant claims 2-9 as evidenced by applicant's admitted prior art as recited in paragraph 21 on page 9 of the instant specification.

5. Claims 1-23 are rejected under 35 U.S.C. 102(e) as being anticipated by Yang et al US Patent Application Publication 2004/0016647 A1(Yang).

Yang teaches an electroplating cell comprising a fluid basin(Fig. 1 numeral 102), an ionic membrane separating an anode compartment and a cathode compartment (page 3 paragraph 25), an anode member located in the anode compartment(Fig. 1 numeral 105) on the lower portion of the fluid basin. Yang further teaches that the ionic membrane may be a NAFION[®] membrane based on poly tetrafluoroethylene(page 3 paragraph 26) or a CMX-SB ionic membrane based on a polydivinilbenzol matrix(page 4 paragraph 27). Yang further teaches a porous ceramic disk shaped diffusion member between the ionic membrane and a substrate plating position(Fig.1 numeral 110, page 5 paragraph 35).

Regarding instant claims 1-23, Yang's electrochemical plating apparatus meets all the limitations of the instant invention. In addition, Yang further teaches that the NAFION® membrane or the CMX-SB membrane are capable of transmitting the claimed amount of metal ions at claimed current densities and having the claimed conductivity (pages 3-4, paragraphs 26-28). Furthermore, even though Yang does not explicitly teach the claimed water transfer rate as recited in instant claims 9 and 23, the ionic membrane of Yang would have inherently been capable of having a water transfer of between about 3 ml/Amphr and about 7.5 ml/Amphr as claimed since Yang teaches the same ionic membrane as the ionic membrane of the instant invention.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1-9 and 11-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hey et al US Patent Application Publication 2002/0011415 A1 (Hey) in view of Copping.

Hey teaches an electrochemical plating apparatus comprising a fluid basin (Fig. 2 numeral 230), an anode compartment (Fig. 2 numeral 292), a cathode compartment (Fig. 2 numeral 272), an anode located on the lower portion of the anode compartment (Fig. 2 numeral 296), an anode enclosure made of polymeric membranes (Fig. 2 numeral 294,

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page 3 paragraph 36) and a porous ceramic disk shaped diffuser(Fig. 2 numeral 276, page 3 paragraph 35).

However, Hey does not explicitly teach the claimed ionic membrane comprising a poly tetrafluoroethylene based ionomer.

The teachings of Copping are discussed in paragraph 4 above.

Therefore, it would have been obvious to one of ordinary skill in the art to have incorporated the NAFION[®] ionic membrane of Copping as the polymeric membrane for the anode enclosure of Hey in order to prevent metal ions produced from the anode from migrating to the cathode compartment as taught by Copping(col. 2 lines 63-67).

Regarding instant claims 1-9 and 11-23, the electroplating apparatus of Hey in view of Copping meets all the limitation of instant claims 1-4, 11-13 and 18-20. Here, the examiner takes the position that the top surface of the NAFION[®] anode membrane enclosure of Hey in view of Copping reads on the claimed ionic membrane separating the anode compartment and the cathode compartment. Furthermore, the ionic membrane of Hey in view of Copping is inherently capable of transmitting the claimed amount of metal ions at claimed current densities, having claimed conductivity at claimed current densities and having claimed water transfer rate as recited in instant claims 5-9, 14-17 and 21-23 since the ionic membrane of Hey in view of Copping is made of the same material as the material used in the ionic membrane of the instant invention.

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8. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hey in view of Copping and further in view of Genders et al US Patent Application Publication 2002/0189950 A1(Genders) and applicant's admitted prior art.

The teachings of Hey in view of Copping are discussed in paragraph 7 above. However, Hey does not explicitly teach the ionic membrane comprising claimed polydivinylbenzol matrix.

Genders teaches a multi-compartment electrodialysis cell comprising cationic membrane such as CMX-SB(page 2 paragraph 21).

Therefore, it would have been obvious to one of ordinary skill in the art to have incorporated the CMX-SB cationic membrane of Genders as the ionic membrane in the electrochemical plating apparatus of Hey in view of Copping since Gender teaches that cationic membrane such as CMX-SB are stable and have a low resistance in a multivalent metal salt solution(page 2 paragraph 21). In addition, since applicant admits in paragraph 23 of the instant specification that CMX-SB ionic membranes are based on a polyfivinilbenzol matrix, the CMX-SB cationic membrane of Hey in view of Copping and Gender meets the limitation of instant claim 10.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Mayer et al US Patent Application Publication 2002/0195352 A1 teaches and electrochemical plating apparatus comprising an fluid basin(Fig. 1 numeral 120), anode

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and cathode compartments separated by a membrane(Fig. 1 numeral 220) and a diffuser(Fig. 1 numeral 230).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lois Zheng whose telephone number is (571) 272-1248.

The examiner can normally be reached on 8:30am - 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

LLZ

ROY KING 
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700